Short-Term Response

- Remove hazardous trees from high-use areas such as yards, roads and rights-of-way.
- Survey your land and determine the severity of the problem; then contact a professional forester.
- Develop a plan that will meet your specific goals and objectives for the areas most heavily damaged by oak decline.
- Use carefully timed prescribed burns to encourage oak and pine regeneration, which reduces competition from shade-tolerant species, and also reduces hazardous fuel-loading.

Long-Term Strategy for Missouri

- Increase the diversity of forest stands to reduce the dominance of one or two tree species.
- Encourge growth among the younger and most vigorous individuals in a stand by thinning out the weakened, diseased trees.
- In multi-aged stands, encourage long-lived and drought-tolerant species such as shortleaf pine and white oak.
- Two-aged stands provide the best opportunity to manage mixed-species systems economically.

Left: Armillaria root rot, a fungus.

A red oak log riddled with borer holes.

For Further Information:

Missouri Department of Conservation
State Forester
P.O. Box 180
Jefferson City, MO 65102
Phone: 573-751-4115
http://www.conservation.state.mo.us/forest/

Mark Twain National Forest
Forest Supervisor
Rolla, MO 65401
Phone: 573-364-4621
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Bruce Moltzan
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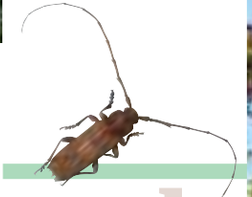


oak DECLINE

Why it's happening and what we can do about it

MISSOURI DEPARTMENT
OF CONSERVATION

Large numbers of northern red, southern red, black and scarlet oaks are declining and dying in southern Missouri and northern Arkansas. Damage has been increasing on the Mark Twain National Forest in Missouri, as well as in the Ozark and Ouachita national forests in Arkansas.

Surveys completed in September 2000 estimated that at least 16,000 acres of the Salem and Potosi districts in the Mark Twain National Forest in Missouri were affected by oak decline. Additional field checks brought estimates to at least 200,000 acres of severe decline in the Mark Twain National Forest. Recent surveys of the Ozark National Forest estimated 300,000 acres were severely affected, up from 19,000 on the Pleasant Hill Ranger District in 1999.

While oak decline occurs naturally throughout the region, it is expected to further increase as the oak forest matures.

A Complex Event

Oak decline occurs when several factors converge. First, red and black oak trees are predisposed to decline because of:

- their age (may live only 70 to 90 years)
- where they grow—shallow, rocky soils and often on ridge tops and upper slopes
- historical land use (excessive harvesting, burning and grazing in early 1900s)

Declines are then triggered by inciting factors such as:

- short-term drought
- repeated insect defoliation
- late-season frosts
- acute pollution

Oak damaging insects include red oak borers (larva above, adult below). Hypoxylon fungus (far right) is also detrimental.

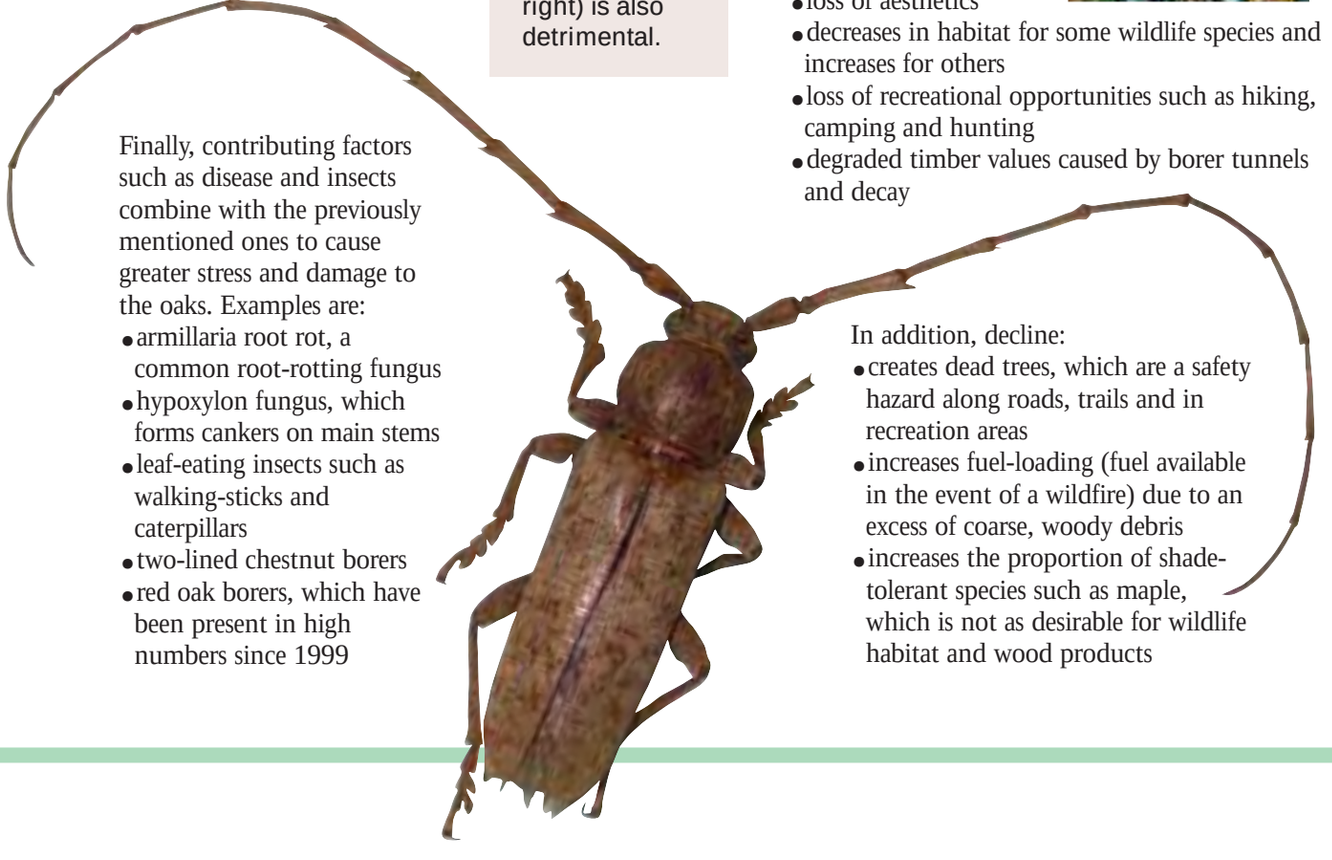
Damage

Dying trees represent:

- loss of aesthetics
- decreases in habitat for some wildlife species and increases for others
- loss of recreational opportunities such as hiking, camping and hunting
- degraded timber values caused by borer tunnels and decay

Finally, contributing factors such as disease and insects combine with the previously mentioned ones to cause greater stress and damage to the oaks. Examples are:

- armillaria root rot, a common root-rotting fungus
- hypoxylon fungus, which forms cankers on main stems
- leaf-eating insects such as walking-sticks and caterpillars
- two-lined chestnut borers
- red oak borers, which have been present in high numbers since 1999



In addition, decline:

- creates dead trees, which are a safety hazard along roads, trails and in recreation areas
- increases fuel-loading (fuel available in the event of a wildfire) due to an excess of coarse, woody debris
- increases the proportion of shade-tolerant species such as maple, which is not as desirable for wildlife habitat and wood products